Attachment JCD-1

Resume of

John C. Donovan

JOHN C. DONOVAN
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Executive Summary

Expert witness in telecommunications for AT&T, MCI WorldCom, the former NYNEX Corporation (now Bell Atlantic), and other clients involving fiber optic damage claims, a patent infringement law suit, and a class action law suit. Experience in setting major corporate strategy, imaginative and innovative problem solving, in-depth analysis, large scale project management involving engineering, physical construction and Information Services systems development. Expert in fiber optics and electronics. Extensive leadership and technical telecommunications background, especially in outside plant design, construction, maintenance, project implementation, cost estimating, network modeling theory, procurement, and logistics. Experienced lecturer and producer of material for presentations to customers and senior management, and in writing strategic position papers.

Professional Experience

Telecom Visions, Inc. **1996 - Present**
Garden City, New York
President

- *Nationally known expert witness before the FCC and state public utility commissions. Appeared before 15 state jurisdictions[1] on behalf of AT&T and MCI WorldCom as their joint Chief Engineering Witness for implementation of the Telecommunications Act of 1996. Providing outside plant local loop expert advice and modeling theory for the HAI Model, a key economic model used by the FCC and various state jurisdictions to determine compliance with the Telecommunications Act of 1996, to set Unbundled Network Element Prices, and to determine the level of the multi-billion dollar Universal Service Fund.*
- *Expert witness for a major U S Patent Infringement law suit, and a fiber optic cable damage case.*
- *Currently providing telecommunications consulting services involving various companies, including work with a major management consulting firm providing support to the government of Portugal, telecommunications and data services management in the northeast for the Bass Brothers Investment company of Fort Worth, Texas; and providing strategic advice on the effect of local loop competition to an equipment manufacturer.*
- *Provided Marketing Strategy for a large fiber optic multiplexer manufacturer introducing a new line of SONET based products.*
- *Manufacturer's representative for automated electronic cross connection devices.*

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[1] *Alabama, Arizona, Colorado, Georgia, Louisiana, Maine, Maryland, Massachusetts, Nevada, New Jersey, New York, Oklahoma, Pennsylvania, Texas, and Washington; advised witnesses and/or prepared testimony for California, Connecticut, Florida, Iowa, Illinois, Kansas, Kentucky, Minnesota, Mississippi, Missouri, Montana, North Carolina, North Dakota, New Hampshire, New Mexico, Rhode Island, South Carolina, Tennessee, Utah, Vermont, and Wisconsin.*

NYNEX **1994 - 1996**

New York City, New York

General Manager, Plug-In Management.

- *Led a group of 350 people in managing all NYNEX logistics functions for NYNEX's $10 billion investment in electronic printed circuit boards for switching systems and digital carrier systems.*
- *Responsibilities included purchasing, billing verification, warehousing, and repairing all NYNEX printed circuit boards.*
- *Scope of operation included average capital purchases of $1 million in new plug-ins per work day, and managing an expense budget of $30 million per year.*
- *Personally responsible for setting NYNEX's strategic direction in this area through major process re-engineering design. This effort included examining business plans, evaluating goals and objectives, and measuring effectiveness of achieving business plan goals. Efforts determined that major realignment was necessary.*
- *Results included consolidating 3 warehouses into one, 50% expense savings, improving repair intervals from 45 days to 5 days, and developing a multi-million dollar, "state-of-the-art" plug-in tracking system. The plug-in tracking system was a major Information Services development effort requiring large scale project management, definition of requirements, detailed design, and supervision of coding by contract programming companies.*

NYNEX **1991 to 1994**

New York City, New York

Managing Director, Engineering & Construction Methods & Systems.

- *Led a group of 115 managers and 45 contractors in maintaining existing computerized design and support systems for Central Office Engineers, Outside Plant Engineers, and Construction Managers that design and construct NYNEX's $2.4 billion annual capital construction program.*
- *Personally devised new, innovative methods for converting paper outside plant records to digital mapping formats, which reduced conversion costs from $150 million to $30 million. This innovative breakthrough has been the cornerstone of records conversion methods by successful companies such a Lucent and IGS (Information Graphics Systems Inc.).*
- *Devised a new Construction Work Management System[2] that mechanized the scheduling and reporting of work (profitability of 41% Rate of Return with a 2 year payback). Project managed a large scale IS development effort involving IS personnel recruited into the organization plus 35 contract IS development personnel from the Oracle Corporation. This multimillion dollar project was successfully completed, comprising the second largest distributed platform developed in North America involving mini-computers and PCs.*
- *Supervised the development of all new Methods & Procedures for emerging technologies such as Fiber To The Curb, and for Open Network Architectures such as Signaling System 7 and Co-Location of Competitive Access Providers in telco switching centers.*

NYNEX **1989 - 1991**

Albany, New York

Director of Operations, Engineering & Construction, Northeastern Region, New York

- *Directed the overall operations of 600 employees and contract personnel to plan, engineer and construct pole line, conduit, fiber cable, copper cable, fiber optic multiplexers, and pair gain equipment to provide service throughout the Northeast region of New York State ($75 million annual budget supporting 86 central office switching center areas).*
- *Developed the NYNEX strategy of using a "business case" method for substantiating outside plant infrastructure improvements now used throughout the company.*
- *Created the "All Fiber Feeder" strategy implemented by NYNEX.*
- *Devised and implemented rapid fiber optic deployment to 225 sites in 16 months.*

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[2] *ECRIS – Engineering Construction Records information System.*

- *Served as the Outside Plant Expert Witness for the 1990 Rate Case, providing the successful rebuttal case for the largest New York Public Service Commission Staff recommended disallowance of $110 million.*
- *Headed the Core Support Team handling the Public Service Commission Operational Audit of Outside Plant throughout New York Telephone.*

NYNEX **1989**
Albany, New York
Director, Customer Services Staff, Upstate New York

- *Directed the Upstate Vice President-Customer Services Staff in support of all 3 Upstate New York regions. Disciplines included Personnel & Training, Capital & Expense Budgets, Installation & Repair Operations, Business Offices, Outside Plant Construction & Engineering, and Facilities Assignment Centers.*

NYNEX **1987 - 1989**
New York City, New York
Director of Operations, Engineering & Facilities Assignment Centers, Midtown Manhattan

- *Directed a force of 150 personnel in engineering and assigning the rapid expansion of all local loop facilities in Midtown Manhattan (Approximately $40 Million Annual Budget).*
- *Created NYNEX's strategy for the aggressive deployment of high technology to customer locations to meet competitor initiatives (primarily Teleport).*
- *In an area responsible for 25% of New York Telephone's revenues, rapid deployment of fiber optics to 450 buildings was achieved in less than 2-1/2 years.*
- *Worked with Lucent Technologies to invent the AUA-45 Private Line card used in their SLC-Series 5 Digital Loop Carrier system, saving New York Telephone $10 million.*
- *Made active sales calls to major customers to design private line networks and disaster recovery systems, resulting in $8 - $10 million in new sales revenue.*
- *Number 1 rated district manager in New York City.*

NYNEX Service Company (Corporate Staff) **1986 - 1987**
New York City, New York
Staff Director, Engineering & Construction Methods

- *Formed the first combined New York/New England corporate staff group supporting engineering and construction after divestiture.*
- *Developed strategies and directed the development of Central Office Engineering, Outside Plant Engineering, and Construction for New York and New England Telephone Companies.*
- *Efforts included start-up activities for the new organization, implementation of new Central Office Engineering design systems, trials on Digitized/Mechanized Outside Plant Records in Burlington Vermont, initiating a mechanized planning system for New England Telephone, and expanding the introduction of high technology into the local loop.*

New York Telephone Company **1982 - 1985**
New York City, New York
Staff Manager, Corporate Staff, Outside Plant Engineering Methods

- *Corporate lightguide expert for Outside Plant.*
- *Authored the Manhattan Overlay Strategy for fiber optic deployment to over 650 commercial buildings.*
- *Conceived, supervised and implemented innovative rapid deployment plan for 13,500 fiber mile interoffice trunk project, completed in 5 months.*
- *Corporate Divestiture expert for Outside Plant.*
- *Wrote the post-divestiture Outside Plant Marketing Business Plan.*

- *Assigned all Outside Plant assets, and negotiated all Outside Plant contracts with AT&T Communications.*
- *Corporate evaluator for employee innovative suggestions.*
- *Corporate evaluator for major projects.*

New York Telephone Company **1980 - 1982**
Garden City, New York
Staff Manager, Long Island Area Staff.

- *Directed a staff group of 17 personnel to track, analyze, evaluate, and make recommendations to upper management concerning operational results for an 800 person Engineering, Construction and Facilities Assignment Center organization.*

New York Telephone Company **1974 - 1980**
Garden City, New York
Engineering Manager, Nassau County

- *Directed an operations center of 55 personnel responsible for cable TV coordination, conduit design, pole engineering, highway improvement coordination, securing Rights of Way, claims adjustments, drafting blue prints, and posting outside plant records.*
- *Supervised a Long Range & Current Planning group of 35 engineering personnel responsible for planning, design, project evaluation, and implementation of major feeder and trunk cable.*
- *Prepared and administered a $20 million per year construction program.*
- *Worked as a Long Range and Current Planner, Feeder Cable Design Engineer, Estimate Case Evaluator and Preparer, and Capital Program Administrator.*
- *Developed new budgeting methods, including writing 30-40 computer programs.*
- *Developed the Cost Estimating Program used by NYNEX and incorporated in the former Bell System JMOS Cost Estimating Model.*

New York Telephone Company **1972 - 1974**
Long Island, New York
Field Manager, Cable Maintenance and Construction, Nassau & Suffolk Counties

- *"Hands-on" craft through second level management experience in constructing and repairing outside plant cable, including analysis, locating, repair, dispatch, and cable trouble trend tracking.*
- *Developed several computer programming systems to track and analyze cable troubles.*

United States Army Signal Corps **1966 – 1970**
Germany; Viet Nam; Fayetteville, North Carolina
Captain

- *Airborne, Ranger, Decorated Viet Nam Veteran (Bronze Star Medal + others), Top Secret Clearance.*
- *Germany: Platoon Leader, Company Executive Officer, Battalion Operations Officer, Battalion Executive Officer*
- *Vietnam: Chief of the Communications Branch - Saigon Support Command*
- *Ft. Bragg, North Carolina: Battalion Communications Officer-82nd Airborne Division*

Education

Penn State Graduate School of Business **1988**
University Park, Pennsylvania
Executive Development Program

Purdue University Graduate School of Business **1970 - 1971**
West Lafayette, Indiana
MBA, Marketing & Finance

United States Military Academy **1962 - 1966**
West Point, New York
BS Electrical & Mechanical Engineering

Organizations

New York City Technical College **1987 - 1993**
Brooklyn, New York
Adjunct Professor of Telecommunications, Chairman of the Transmission Laboratory, Member of the Telecommunications Executive Committee, Member of the Board

Shenendehowa School Board **1991**
Clifton Park, New York
Served on the Technology Planning Committee for the local school board

AM/FM International **1993 - 1994**
Boulder, Colorado
Member of Executive Management Board, representing the telecommunications industry for the world's largest organization of digitized mapping and facilities management professionals.

Member of Various Other Organizations:
MENSA High IQ Society, IEEE, Amateur Radio Emergency Services group.

Recent Published Articles

"The Multi-Billion Dollar Outside-Plant Estimate Case", OSP Engineering & Construction Magazine, February 1999 issue, pp. 14-15. See this published article at: http://www.broadband-guide.com/cbl4man/standards/stand0299.html

Recent Testimony

- Before the State Office of Administrative Hearings for the Public Utility Commission of Texas, Austin, Texas;

Docket No. 16226: Petition of AT&T Communications of the Southwest, Inc. for Compulsory Arbitration to Establish an Interconnection Agreement Between AT&T and Southwestern Bell Telephone Company; On behalf of AT&T of the Southwest;
Docket No. 16285: Petition of MCI Telecommunications Corporation and Its Affiliate MCIMetro Access Transmission Services, Inc. for Arbitration and Request for Mediation Under the Federal Telecommunications Act of 1996; On behalf of MCI Telecommunications Corporation;
Oral Deposition: August 30, 1996 Testimony: October 2-3, 1996

- Before the Arizona Corporation Commission;

Docket No. U-2428-96-417: In the Matter of the Petition of AT&T Communications of the Mountain States, Inc. for Arbitration with U S WEST Communications, Inc. of Interconnection Rates, Terms, and Conditions Pursuant to 47 U.S.C. § 252(b) of the Telecommunications Act of 1996; On behalf of AT&T Communications of the Mountain States;
Docket No. U-3175-96-479: In the Matter of the Petition of MCI Metro Access Transmission Services, Inc. for Arbitration of Interconnection Rates, Terms, and Conditions Pursuant to 47 U.S.C. § 252(b) of the Telecommunications Act of 1996; On behalf of MCI Metro Access Transmission Services, Inc.
Testimony: November 20, 1996

- Before the Public Utilities Commission of the State of Colorado

Re: The Investigation and Suspension of Tariff Sheets Filed by U S WEST Communications, Inc. with Advise Letter No. 2617, Regarding Tariffs for Interconnection Local Termination, Unbundling, and Resale of Services; On behalf of AT&T of the Mountain States and MCI Telecommunications Corporation;
Oral Deposition: April 9, 1997

- Before the Pennsylvania Public Utility Commission;

Docket No. I-00940035: In re: Formal Investigation to Examine and Establish Updated Universal Service Principles and Policies for Telecommunications Services in the Commonwealth; On behalf of AT&T Communications of Pennsylvania, Inc. and MCI Telecommunications Corp.;
Testimony: October 21 & 23, 1997

- Before the State of New Jersey Board of Public Utilities;

Docket No. TX95120631: In the Matter of the Board's Investigation Regarding Local Exchange Competition for Telecommunications Services; On behalf of AT&T Communications of New Jersey, Inc. and MCI Telecommunications Corp.;
Oral Deposition: October 27, 1997

- Before the State of Maine Public Utilities Commission;

Docket No. 97-505: In re: Public Utilities Commission Investigation of Total Element Long-Run Incremental Cost (TELRIC) Studies and Pricing of Unbundled Network Elements; On behalf of AT&T Communications;
Written Testimony: December 22, 1997

- Before the Louisiana Public Service Commission;

Docket U-20883, Subdocket A: In re: Submission of the Louisiana Public Service Commission's Forward-Looking Cost Study to the FCC for Purposes of Calculating Federal Universal Service Support Pursuant to LPSC order No. U-20883 (Subdocket A), dated August 12, 1997; On behalf of AT&T Communications of the South Central States, Inc.;
Oral Deposition: January 21, 1998 Testimony: January 29, 1998

- Before the Alabama Public Service Commission;

Docket No. 25980: Re: Implementation of Universal Service Requirements of Section 254 of the Telecommunications Act of 1996; On behalf of AT&T Communications of the South Central States, Inc.;
Testimony: February 26, 1998

- Before the Nevada Public Utilities Commission;

Docket No. 98-6004: Re: Filing of Nevada Bell Unbundled Network Element (UNE) Cost Study; On behalf of AT&T Communications of Nevada, Inc.;
Testimony: July 1, 1998 Supplemental Testimony: September 3, 1998

- Before the Nevada Public Utilities Commission;

Docket No. 98-6005: Re: Filing of Central Telephone Company-Nevada d/b/a Sprint of Nevada's Unbundled Network Element (Unbundled Network Element) Cost Study; On behalf of AT&T Communications of Nevada, Inc.;
Testimony: July 1, 1998 Supplemental Testimony: December 4, 1998

- 19th Judicial District Court, East Baton Rouge, LA:

Case No. 436582, Division J, Petition for Damages: TCI Cablevision of Georgia, Inc. DBA TCI of Louisiana v. Barber Brothers Contracting, Inc.; Expert Report on behalf of Defendants;
Expert Report: December 30, 1998 Settlement based on Expert Report: February 5, 1999

- Before the Maryland Public Service Commission:

Docket No. 8786: Re: Investigation of Non-Recurring Charges for Telecommunications Interconnection Service; On behalf of AT&T Communications of Maryland, Inc. and MCI Telecommunications, Inc.;
Surrebuttal Testimony: January 15, 1999

- Before the Massachusetts Department of Telecommunications and Energy;

Docket Nos. 96-73/74, 96-75, 96-80/81, 96-83, and 96-84: Re: Consolidated Petitions for Arbitration of Interconnection Agreements – Dark Fiber; On behalf of AT&T Communications of New England, Inc.;
Testimony: February 17 & 19, 1999

- Before the Georgia Public Service Commission;

Docket No. 10692-U: Re: Generic Proceeding to Establish Long-Term Pricing Policies for Unbundled Network Elements; On behalf of AT&T Communications of the Southern States, Inc.;

Oral Deposition:	June 17, 1999	Prefiled Testimony:	June 30, 1999
Prefiled Rebuttal Testimony:	July 9, 1999	Testimony:	July 13 & 14, 1999

<u>EXHIBIT "EHG-RW-7"</u>

TYPES OF xDSL TECHNOLOGIES

1. There are important distinctions between the types of DSL technologies, and these differences explain why there are multiple DSL technologies that are currently being offered to residential and business consumers in New York and elsewhere throughout the United States. The following paragraphs contain a brief explanation of the technical parameters of the various types of xDSL technologies successfully being deployed by Rhythms in New York and elsewhere throughout the country. As technologies evolve, these parameters will also change, thereby continually expanding the capabilities of, and consequently the deployment of, xDSL technologies.

<u>ADSL</u>

2. ADSL was originally developed to support the delivery of entertainment video, or "video dial tone," services over existing copper loops. Such video services require much higher bandwidth in the "downstream" direction (toward the customer premises) than they do in the "upstream" direction (toward the central office), because the video signals being transmitted to the customer's premises require a large amount of bandwidth, and the upstream signal was assumed to be a voice or non-video data signal requiring much less bandwidth. Thus, the need for bandwidth was deemed to be asymmetrical; that is, a high-bandwidth signal in the downstream direction and a lower bandwidth signal in the upstream direction.

3. Even though most (if not all) ILECs have not deployed video dial tone services based on ADSL, this asymmetrical DSL technology has found a new use: Internet access. Internet access tends to display asymmetrical traffic patterns similar to video dial tone services. Most of the traffic flows toward the end user, as graphics-intensive web pages and data

files are downloaded. The upstream traffic consists of a few keystrokes and occasional uploads of e-mail and data files.

4. ADSL is designed to achieve a downstream transmission rate of 1.5 Mbps for loops of up to 18,000 feet in length, and a downstream transmission rate of 7 Mbps for loops of up to 6,000 feet in length, assuming 2-wire loops of 24-gauge copper. The downstream and upstream data signals are transmitted using separate frequencies, and both data streams use frequencies above the frequencies used to transmit voice signals.

RADSL

5. RADSL is a type of ADSL. As is the case with other types of ADSL, the downstream and upstream data transmission rates of RADSL are asymmetrical (though it is also possible to configure RADSL for symmetrical data transmission rates). RADSL is more flexible than other types of ADSL because it is rate adaptive; that is, the DSL equipment automatically adjusts the transmission speed to the optimal level achievable on each loop. RADSL can therefore transmit data at a wide range of transmission speeds, depending on the length and condition of the loop being used.

6. RADSL is designed to achieve a downstream transmission rate of 1.5 Mbps for loops of up to 18,000 feet in length, and a downstream transmission rate of 7 Mbps for loops of up to 9,000 feet in length, assuming 2-wire loops of 24-gauge copper. The downstream and upstream data signals are transmitted using separate frequencies, and both data streams use frequencies above the frequencies used to transmit voice signals.

SDSL

7. SDSL was developed to support symmetrical data transmission rates of up to 1.5 Mbps in each direction. There are several types of SDSL, using a variety of line coding

approaches, and supporting variable data transmission rates. SDSL is designed to achieve symmetrical transmission rates of up to 1.5 Mbps for loops that exceed 20,000 feet in length (for one type of SDSL), assuming 2-wire loops of 24-gauge copper. The downstream and upstream data signals are transmitted using the same frequencies. The data signals use a frequency bandwidth that includes the frequencies used to transmit voice signals. As a result, SDSL-equipped loops cannot be used for simultaneous analog POTS service.

HDSL

8. HDSL is also a symmetrical DSL configuration. HDSL supports a data transmission rate of 1.5 Mbps in each direction. Unlike other types of DSL, HDSL requires a 4-wire circuit (that is, two 2-wire loops). HDSL can achieve 1.5 Mbps on loops up to 12,000 feet in length, assuming loops of 24-gauge copper. The downstream and upstream data signals are transmitted using the same frequencies. The data signals use a frequency bandwidth that includes the frequencies used to transmit voice signals. As a result, HDSL-equipped loops cannot be used for simultaneous analog POTS service.

IDSL

9. IDSL is a symmetrical DSL configuration. IDSL uses the same coding and parameters as ISDN, a digital data technology that has been in use by BA-NY and other ILECs for quite a while. As a result, IDSL can be deployed on copper or copper/fiber loop plant configurations. IDSL supports a data transmission rate of 128 Kbps in each direction, on 2-wire loops of up to 35,000 feet in length, assuming loops of 24-gauge copper. As is the case with SDSL and HDSL, IDSL transmits the downstream and upstream data signals using the same frequencies. The data signals use a frequency bandwidth that includes the frequencies used to

transmit voice signals. As a result, IDSL-equipped loops cannot be used for simultaneous analog POTS service.

EXHIBIT "EHG-RW-8"

xDSL IMPAIRING DEVICES

LOAD COILS

1. Load coils are devices placed on a copper loop at regular intervals if the loop exceeds a certain length, typically 18,000 feet. Telecommunications signals attenuate, or lose strength, due to the resistance of the copper in the loop; the greater the loop length, the more the attenuation and the weaker the signal received at the customer's premises. Also, attenuation is greater at higher frequencies than at lower frequencies, reducing the quality of the voice signal. Load coils modify the electrical characteristics of a copper loop to overcome the attenuation distortion associated with long loops. None of the xDSL technologies discussed above can be deployed on loops equipped with load coils. The load coils are not compatible with the higher transmission frequencies employed by xDSL technologies.

2. Load coils can be removed from loops. Load coils are located outside the central office, usually in manholes, vaults, pedestals or other enclosures. To remove load coils, a service technician must be dispatched to the location(s) in question. Given the availability and expected rapid spread of xDSL technologies, it is most efficient to remove load coils in minimum increments of one cable binder group, which normally contains 25 wire pairs for new cable deployment. Most ILECs have been removing legacy load coils from copper loops for years in order to support ISDN services and provisioning of T-1 circuits using HDSL technology.

3. Not all loops require load coils to be installed on them. According to BellCore loop engineering standards, load coils should only be placed on loops that are over 18,000 feet in length. Because ADSL is typically deployed at lengths up to 18,000 feet, load

coils should not have been installed on loops that BA-NY provisions as "ADSL-capable." If load coils do appear on any loop less than 18,000 feet in length, the purchasing CLEC should not be forced to reimburse BA-NY for removing them because they have been installed contrary to established design standards. Indeed, BA-NY conceded that it should not have load coils on loops under 18,000 feet and therefore would not charge CLECs to remove load coils on loops under 18,000 feet.[34]

BRIDGED TAPS

4. Bridged taps refer to the ILEC practice of configuring the loop plant in such a way that a single wire pair can be used to serve multiple end-user locations (although not simultaneously). This configuration allows an ILEC to deploy fewer copper facilities all the way to the end user premises, and historically was a method to address the uncertainty of the rate of demand growth in a particular area.

5. Bridged taps create additional degradation for xDSL signals. Bridged taps are used to extend the telephone cable to additional homes so that vacant loops will be available to fulfill customer requests. Any portion of the loop that extends to a customer premises other than that of the requesting customer, and thus is not in the direct talking path to the central office, is called a bridged tap. Bridged taps reduce the amount of the signal that reaches the customer premises, and the effect varies, depending on the bridged-tap length and the frequency spectrum of the xDSL.

6. xDSL technology can be deployed on a loop equipped with bridged taps, so long as bridged taps are not excessive in length. The total cumulative length of bridged taps on a loop must generally be less than 2,500 feet. Short bridged taps of 200-300 feet located near

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[34] *See* John White, Bell Atlantic, "Loop Qualification" (Aug. 10, 1999) (presented Aug. 10, 1999 at NYPSC sponsored DSL Collaborative meeting) at 3-5 (attached hereto).

customer premises can also create problems because of a "tuned resonance" effect. BA-NY stated during the DSL Collaborative meetings that its copper loop plant may contain up to 6,000 feet of bridged taps on loops under 18,000 feet in length.[35]

7. In order to remove bridged taps, as is the case with load coils, a technician must be dispatched to the field to remove the bridged taps.

REPEATERS

8. A repeater is used to boost the signal strength to avoid attenuation on long loops. BA-NY's legacy copper loop plant contains different kinds of repeaters for different types of existing services. Repeaters for analog POTS loops are located in the central office, but are only used on very long loops (in fact, such loops will likely be too long to use for any xDSL-based service other than IDSL). Analog POTS repeaters are used to boost the voice signal and the DC voltage of a POTS circuit. Other types of loops, such as loops used to provide T-1 service, may have repeaters located in the outside loop plant (such repeaters, of course, have little if any relevance to the provisioning of 2-wire xDSL-capable loops). Repeaters must be removed before loops can be used for ADSL, RADSL, SDSL, or HDSL. Analog POTS repeaters located in central offices can be removed by CO-based technicians. A technician must be dispatched to the field to remove T-1 repeaters.

DIGITAL LOOP CARRIER SYSTEMS

9. Digital Loop Carrier systems involve the multiplexing of telecommunications signals and the carriage of that multiplexed signal on a transmission medium. Although ILECs have historically deployed DLC systems on copper, essentially all DLC systems today are deployed on fiber systems. DLC systems serve two purposes. First, they

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[35] *Id*, at 3.

allow the ILEC to use fewer facilities in the feeder portion of the loop plant. Second, with respect to fiber-based DLC systems, they allow longer loops to be provisioned without the use of load coils.

10. At the present time, particularly with respect to fiber-based DLC systems, xDSL technology (except IDSL) is not compatible with DLC systems. However, several vendors are currently working on solutions that will allow xDSL technologies to be used on DLC systems. Moreover, as indicated below, there are at least two near-term solutions available today: regrooming the loop plant to use a loop carried on parallel all-copper systems, and placement of additional equipment in the field.

11. Fiber-based DLC systems, once deployed, are an integral part of the loop plant for the loop in question. Thus, fiber-based DLC systems cannot be removed entirely. However, fiber-based DLC systems usually are deployed on feeder routes that are currently also equipped with copper feeder facilities. These copper facilities are normally not removed when the fiber systems are deployed to overbuild the feeder route. Thus, for a particular loop currently carried by a fiber-based DLC system, it is usually possible to regroom the loop plant to obtain a copper loop carried by the parallel copper feeder facilities, which can be used to provide xDSL services to the customer premises in question.

12. BA-NY has agreed to regroom the loop plant by moving an existing customer served on a loop traversing copper feeder to a loop traversing fiber feeder in order to free up the copper for use as an xDSL loop.[36] However, BA-NY intends to charge an as yet unspecified amount for performing such a pair swap or regrooming.

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[36] Bell Atlantic, "Freeing up copper facilities" ("Sept. 15, 1999) (presented Sept. 15, 1999 at NYPSC sponsored DSL Collaborative meeting) (attached hereto).

13. A second approach to work around the presence of fiber in the feeder plant is to place xDSL equipment at the feeder distribution interface in the field. Such equipment is known as a Digital Subscriber Line Access Multiplexer ("DSLAM"). For xDSL services, the basic requirement is that DSLAMs are placed at the end of the copper loop facility, wherever the copper ends. That copper loop can run all the way to the main distribution frame ("MDF") in the central office, in the case of an all-copper loop, or to the feeder distribution interface ("FDI"), in the case of a fiber-based DLC system. Feeder distribution interfaces for fiber-based feeder systems are normally located in controlled environmental vaults ("CEVs") or other enclosures that house the associated fiber, multiplexing and cross connect equipment. These same locations can be used to house DSLAMs.

14. The presence of fiber in the loop constrains the provision of xDSL services equally for BA-NY and Rhythms. That is, they both need to put DSLAMs in the feeder distribution interface location in order to provide xDSL-based services if there is no available copper feeder plant for the loop(s) in question.

15. The placement of DSLAMs at these locations is technically feasible. In its March Advanced Services Order, the FCC specifically requires ILECs to permit collocation in CEVs.[37] Further, even if BA-NY were to continue to insist that such collocation constitutes "sub-loop unbundling," the FCC in its UNE remand decision has ordered ILECs to provide sub-loop unbundling.[38] Moreover, as noted above, if BA-NY served this customer using present technology, it would have to collocate its DSLAM in the remote terminal.

16. BA-NY does not intend to de-condition loops for its InfoSpeed[tm] DSL

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[37] *Advanced Services Order* ¶44.

[38] *FCC Promotes Local Telecommunications Competition: Adopts Rules on Unbundling of Network Elements*, FCC News (Sept. 15, 1999) (The FCC "required incumbents to provide unbundled access to subloops, or portions of loops, and dark fiber optic loops and transport.")

service offering, and thereby does not intend to "reach" all potential DSL end users. Thus, if BA-NY refuses to provide access to remote terminals to CLECs such as Rhythms that want to service these customers, many New York consumers will continue to be denied high speed data capabilities.

Bell Atlantic

Loop Qualification

John White

August 10, 1999

Loop Qualification

- Telephone Plant
  - Planning Rules
  - Design Rules

- Wire Center Data

- Loop Qualification Template

Loop Qualification

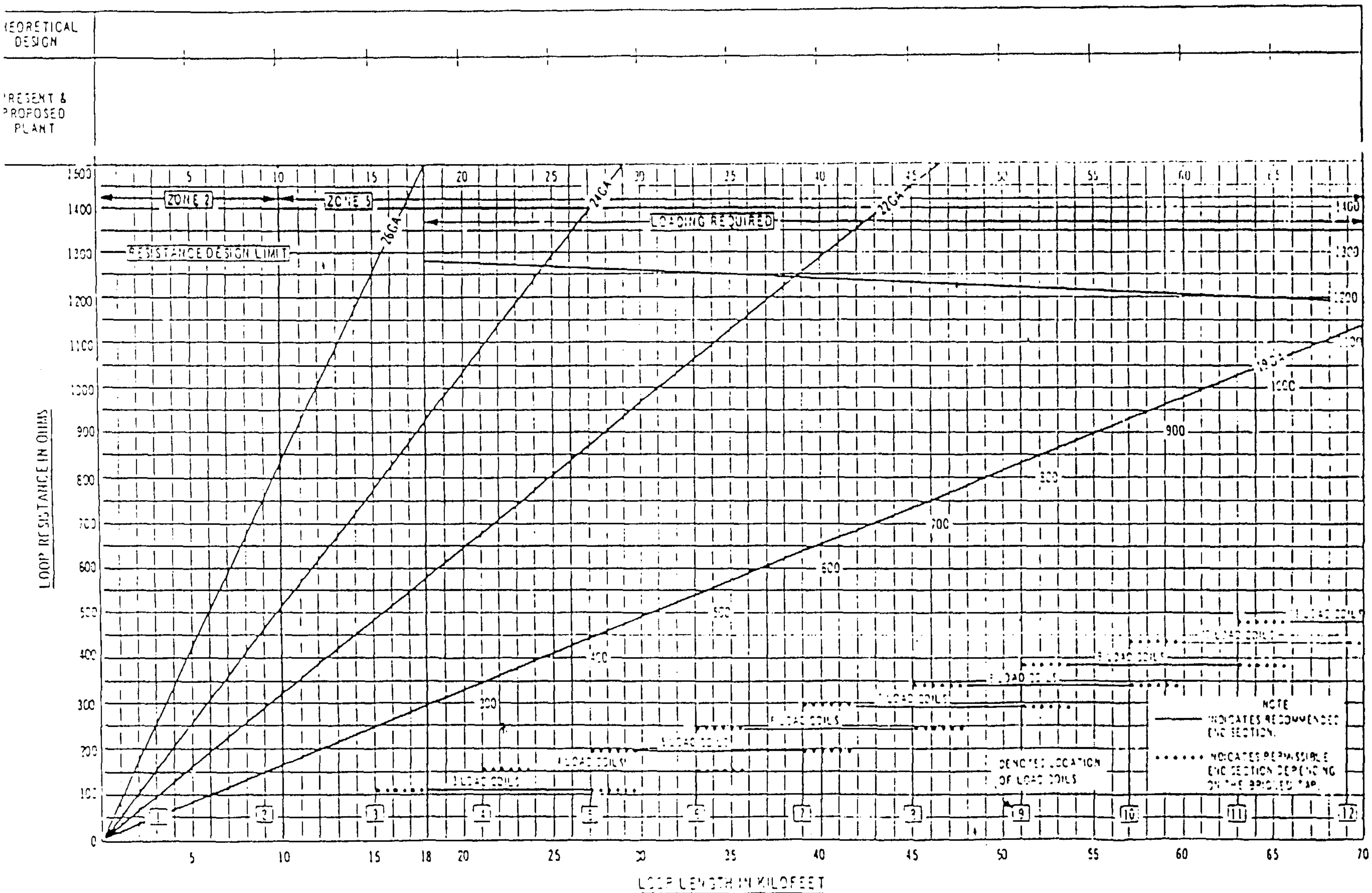
@Bell Atlantic

- Loop Planning Rules (Embedded Network)
  - Maximum loop resistance 1300 Ohms
  - Loading required on any loop over 18000 ft
  - Bridge Tap on non loaded plant limited to 6000 ft
  - Theoretical design = 2 gauges

EXHIBIT #24

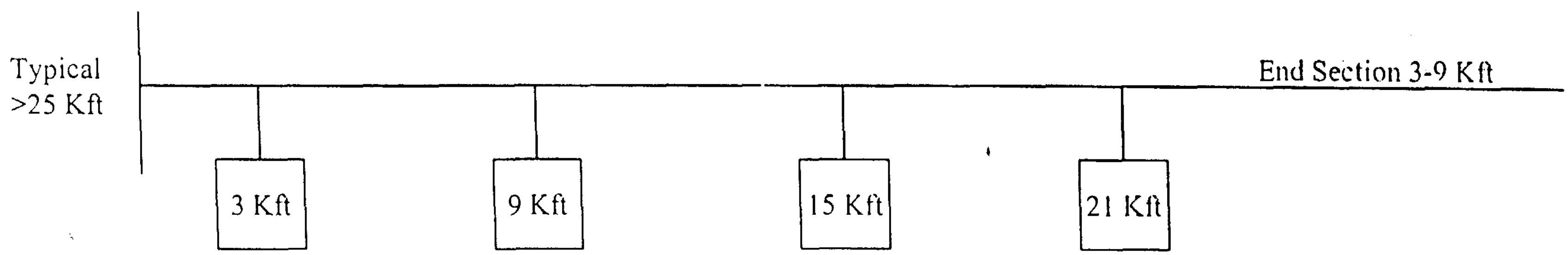
SLIDE #15

RESISTANCE DESIGN WORK SHEET



Number of Loads at Loop Length

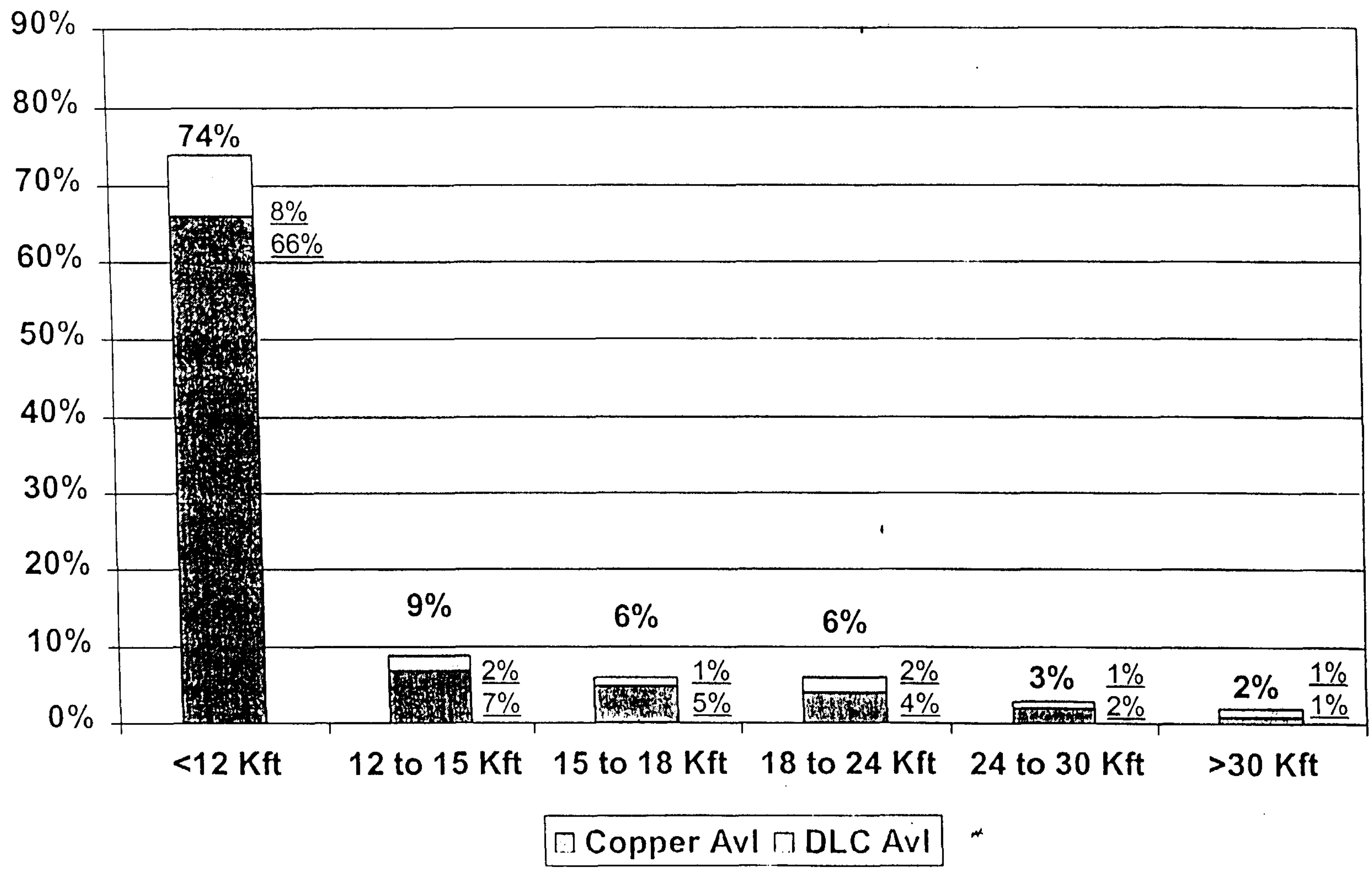
Kilofeet	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
# of Loads	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	4	4	4	4	4	4



Cable Gauge vs. Loop Length

Kilofeet of																														
Total Kft	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
26 Gauge	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	14.5	13.0	11.5	9.0	7.5	6.0	4.0	2.5	1.0						
24 Gauge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	4.0	6.5	10.0	12.5	15.0	18.0	20.5	23.0	24.0	22 0	20.0	18.5	17.5	15.5
22 Gauge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	4.0	7.0	9.5	11.5	14.5

Available Pairs as a Percentage of Total Loop Length Intervals
New York Wire Centers with Collocation



Loop Qualification - xDSL

Syra. E. Genes
WIC

Key: Required Conditional Optional

Loop Qualification - xDSL

3551 Erie Blvd E
Dewitt NY

End User State	New York
Customer Indicator	UNE
Service Provider	4634
Service Area ID	
Service Address Telephone Number	3154460000
Service Address House Number	
Service Address House Number Suffix	
Assigned House Number	
Route Number	
Box Number	
Service Address Street Directional	--
Service Address Street Name	
Service Address Thoroughfare	
Service Address Street Suffix	
Unit Type	
Unit Information	
Elevation	
Structure Type	
Structure Information	
Service Address City	
Service Address State	New York
Street Address Zip Code	

Submit Hold Order Cancel

Go to Service Request Page

Loop Qualification - xDSL

View the RAW EIF File

Administrative Data Table	
Billing Telephone Number	2123954085
End User State	NY
Customer Indicator	C
Version	AA
Customer Negotiator Name	Roslyn Sanchez
Purchase Order Number	19990809140407
Customer ID	ZBEL
Customer Negotiator Telephone Number	2123954085
Business Segment	R
Loop Qualification - xDSL	
Service Address State	NY
xDSL Services Available	Loop is not qualified
xDSL Qualification Indicator	Y
Loop Length	16.4

Loop Qualification - xDSL

Key: Required Conditional Optional

ITHACO TIC[illegible]
ST[illegible]

209 N. AURORA
ITHACA

Loop Qualification - xDSL

End User State	New York
Customer Indicator	UNE
Service Provider	4634
Service Area ID	
Service Address Telephone Number	6072728410
Service Address House Number	
Service Address House Number Suffix	
Assigned House Number	
Route Number	
Box Number	
Service Address Street Directional	--
Service Address Street Name	
Service Address Thoroughfare	
Service Address Street Suffix	
Unit Type	
Unit Information	
Elevation	
Structure Type	
Structure Information	
Service Address City	
Service Address State	New York
Street Address Zip Code	

Submit Hold Order Cancel

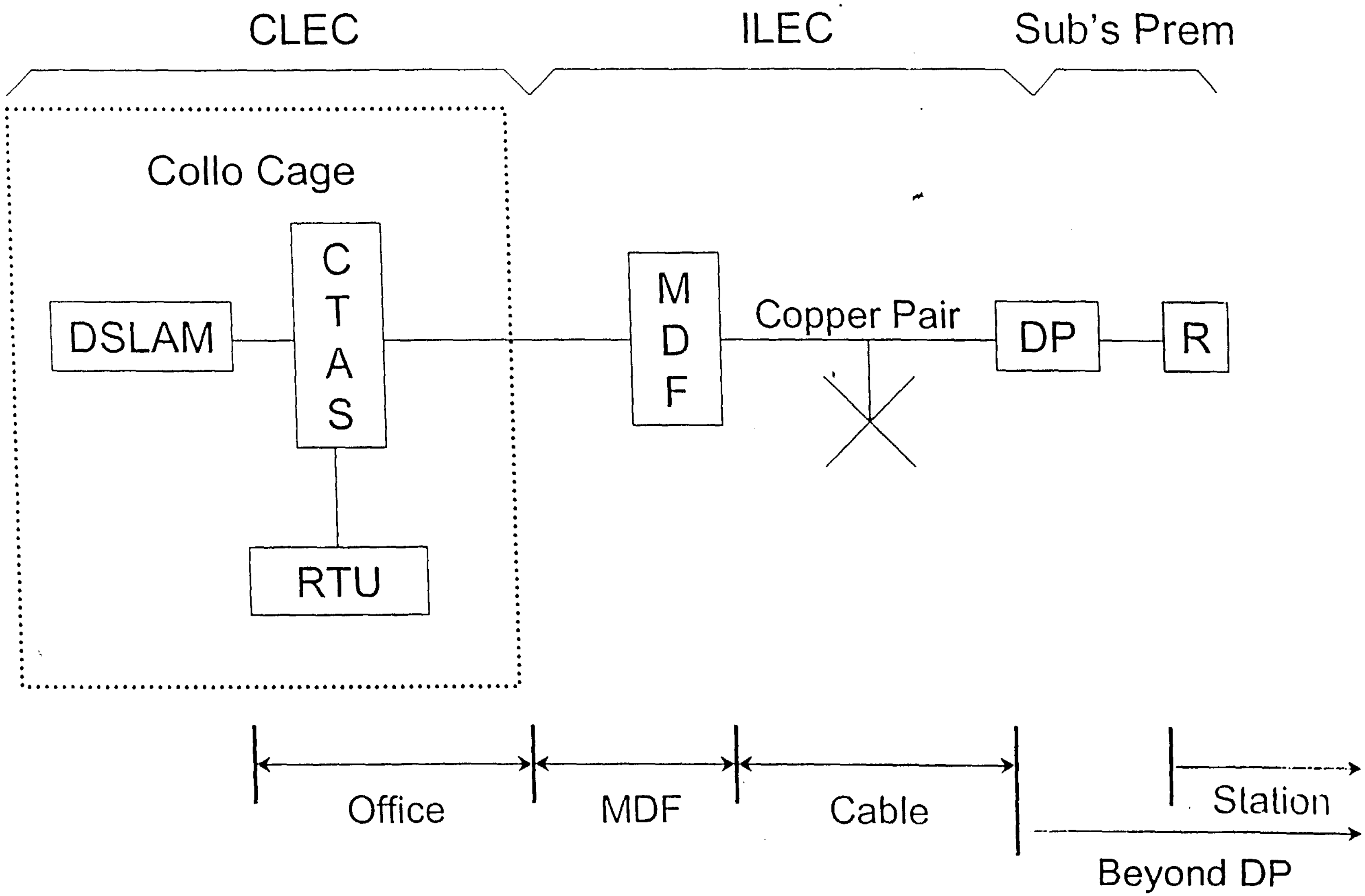
Go to Service Request Page

Loop Qualification - xDSL

View the RAW EIF File

Administrative Data Table	
Billing Telephone Number	2123954085
End User State	NY
Customer Indicator	C
Version	AA
Customer Negotiator Name	Roslyn Sanchez
Purchase Order Number	19990809140753
Customer ID	ZBEL
Customer Negotiator Telephone Number	2123954085
Business Segment	R
Loop Qualification - xDSL	
Service Address State	NY
xDSL Services Available	640KBPS/90KBPS 1.6MBPS/90KBPS 7.168MBPS/680KBPS
xDSL Qualification Indicator	Y
Loop Length	1.9

xDSL Copper Pair Testing Architecture



Testing Challenges

Dry Copper Pair:
- No Dial Tone
- No Telephone Number
- No MLT availability
- No Battery
- No NT-1, No SPID
- No MTU or 1/2 Ringer
- Tone - sometimes available
- Training tone - intermittent and differs for each technology
- Different Test Signatures:
  - Looking from Field to DSLAM: open, Line Unit
  - Looking from C.O. to Modem: SC, CPE, Router
- Large variety of different loop technologies and equipment vendors

Cooperative Testing

Goals:

Steady and Standard Tone Generation Eliminates Connectivity Concerns

Shared Test Results Early AM on Due Date

Testing to NID with MaintenanceBenchmarks Established and Shared

Freeing up copper facilities

When a "no facilities" condition is encountered on a loop order, there is a hierarchy of activities that BA will perform in order to attempt to free up facilities. This hierarchy is used in BA Retail and is also used in BA Wholesale when Unbundled loops are requested. There are several steps in this hierarchy that are inappropriate activities when an unbundled loop order is being provisioned, mainly on xDSL types of requests. For example, one of the steps in this hierarchy is to assign a Digital Access Main Line (DAML). This would not be an appropriate solution to free up facilities on a 2W ADSL qualified loop request, for example, because ADSL will not work over a DAML which is considered to be electronics.

The steps that BA NY will go through to find alternate facilities as part of the assignment/provisioning process are shown in the table below. The steps that are transparent to the CLEC and done at no additional charge are identified in the description below the table. In addition, those steps that require CLEC notification and approval due to charges that are assessed if the work activity is performed in additional to longer intervals that may be required are identified below as well.

Provisioning Table

The intent of this table is to illustrate the standard Corporate process flow for processing an order when an outside plant facility is not available at the assignment stage of the provisioning process.

	2W Analog Retail/Wholesale			2W Digital (ADSL) Retail/Wholesale			2W Digital Premium (ISDN) Retail/Wholesale		
Alternate Facilities	X	X		X	X		X	X	
CF	X	X		n/a	X		X	X	
BCT	X	X		n/a	X		X	X	
LST	X	X		n/a	X		X	X	
WOL	X	X		n/a	X		X	X	
CDP	X	X		X	X		X	X	
DAML		X	X		n/a	n/a		X	X
TOV	X	X		n/a	X		X	X	
Special Construction /Other	X	X		n/a	n/a		X	X	

BA has worked into its provisioning process the items in the hierarchy that are possible and applicable on unbundled loops, more specifically, on xDSL qualified loops. As shown by the table above, if facilities are not available in the pre-qualification process for BA Retail ADSL requests, the end user is notified that facilities are not available and ADSL is not provisioned. Where possible and *when feasible, BA performs these steps in the provisioning/assignment process for a CLEC/DLEC, requesting a xDSL compatible loop in order to free up facilities.*

Table Explanation:

Alternate Spare facilities: If an alternate spare facility can be verified good to the serving terminal, the service will be provisioned and the service order completed. This step is transparent to the end user or to the CLEC. Charges are not assessed.

CF – Connected Facility. 2nd or 3rd line to location which is not in use is freed up. This step is transparent to the end user or to the CLEC. Charges are not assessed.

BCT – Break Cut Through Facility (Normally date sensitive). This arrangement involves a facility that is dedicated to a particular location. Normally the pair remains dedicated when premises vacated for next occupant. If facilities are needed, these facilities can be made available after a certain period of time, however, this leaves the premises where the facilities were taken from in a "no facilities" situation. This step is transparent to the end user or to the CLEC. Charges are not assessed.

LST – Line and Station Transfer/Pair Swaps. Line and station transfers or pair swaps are considered in order to free up facilities. Line and station transfers are not done in BA Retail to free up facilities for BA Retail ADSL service; the end user request is turned back as "no facilities" available. LSTs are done for CLECs/DLECs, and because they involve multiple scenarios, incur charges, and require longer intervals, the CLECs/DLECs are made aware of these transfers/swaps.

BA NY will perform a pair swap (DLC to copper) which involves moving an existing customer served on DLC onto copper, where copper is available, in order *to provision a xDSL loop to a CLEC/DLEC's end user. This work will be done in the normal provisioning process and is transparent to the CLEC. Charges are not assessed.*

BA NY will perform a pair swap (copper to copper) of cable pairs when BA NY must move a customer's existing service to another pair in order to support the requested service transmission parameters or must move a jumper in order to free up a spare at a different terminal. This involves additional I&M work, requires the approval of the CLEC/DLEC, requires a different interval; additional charges are billed.

BA NY will perform a pair swap (copper to DLC) which involves moving an existing customer served on copper to DLC to free up the copper. In this situation, BA will move an analog customer off copper onto DLC in order to free up copper for a xDSL loop order. This work activity includes work at a cross-box and also involves moving a jumper. This requires additional I&M work, requires the approval of the CLEC/DLEC, requires a different interval; additional charges are billed.

WOL – Wire out of limits. This work is done when the only free facilities are not located on the one that would normally serve the end user location. (generally when the only free facilities are on the adjacent terminal in either direction). This requires the placement of a drop. This work is transparent to the end user or CLEC. Charges are not assessed.

CDP – Clear Defective Pair. This option is utilized for POTS single line service, it is not used for designed or multi-line service orders nor for terminals associated with a Pair Gain System (Litespan, Universal, or Integrated). Clearing defective pairs involves significantly more work than the other options. This step may require longer intervals and additional charges may be assessed.

DAML – Additional Main Line. This work is done in areas where there is a shortage of facilities. Because this option includes adding physical equipment to the loop which acts as electronics, this option is not feasible for xDSL loop requests. In the case of an analog loop, this work is transparent to the end user or CLEC. Charges are not assessed.

CERTIFICATE OF SERVICE

I, Stanley M. Bryant, do hereby certify that on this 19th day of October, 1999, I have served a copy of the foregoing document via messenger, to the following:

Stanley M. Bryant

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Washington, D.C. 20554

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Federal Communications Commission
445 12th Street, S.W., Room 8B-115
Washington, D.C. 20554

Commissioner Harold Furchtgott-Roth
Federal Communications Commission
445 12th Street, S.W., Room 8A-302
Washington, D.C. 20554

Commissioner Gloria Tristani
Federal Communications Commission
445 12th Street, S.W., Room 8C-302
Washington, D.C. 20554

Commissioner Michael Powell
Federal Communications Commission
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